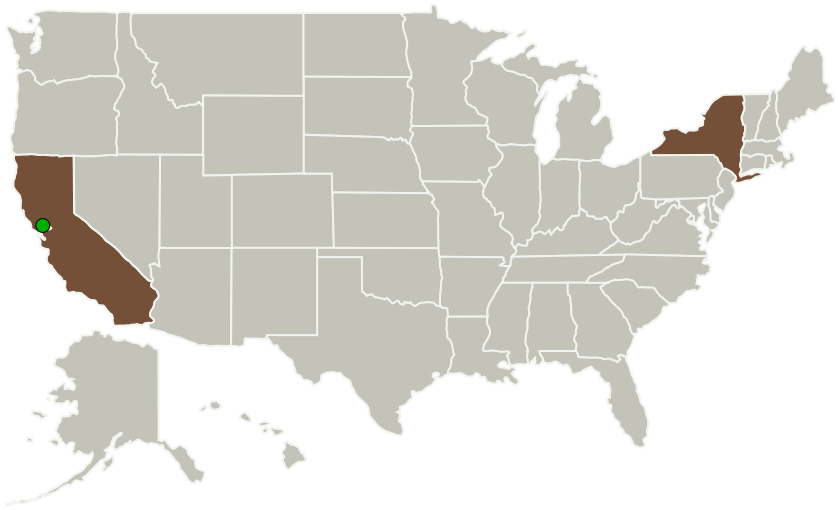
Adaptive Rotorcraft Condition and Usage Tracking System (ARCUTS), Phase I

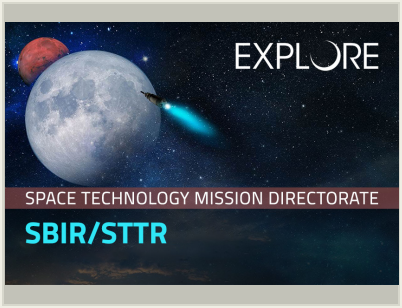
Completed Technology Project (2012 - 2012)

Project Introduction

International Electronic Machines (IEM), a leader in the development of innovative sensor solutions for transportation systems, will develop the Adaptive Rotorcraft Condition and Usage Tracking System (ARCUTS), building upon and integrating wireless instrumentation systems developed for the U.S. Navy, CBM systems developed for the U.S. Army, and condition and diagnostic sensing systems developed for other Federal, state, and commercial purposes. ARCUTS will combine wireless technologies with specific sensing capabilities which may be targeted towards any aspect of the drive or engine systems. For Phase I, IEM will focus on a unique and innovative wireless torque monitoring approach for drive shafts which combines capabilities of two of IEM¿s patented and patent-pending inventions into a single powerful system for measuring and tracking torque at high sample rates (to detect even short transient strains) and high accuracy (to less than 1%) to permit accurate and reliable CBM of shafts and immediately dependent components. Torque measurement is proposed because accurate, high-speed torque measurement has strong implications not only for CBM applications but also for proper control and power usage applications on rotorcraft and in other settings as well. IEM will also show how ARCUTS provides its adaptability by demonstrating that the same core technology can be used to track the condition of other components of the drive train and engine. IEM will be supported in this work by the Boeing Corporation, premier designers and manufacturers of military and civilian rotorcraft as well as fixed-wing aircraft and one of NASA¿s partners in the development of the LCTR-2.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Completed Technology Project (2012 - 2012)

Organizations Performing Work	Role	Type	Location
International Electronic Machines Corporation(IEM)	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Troy, New York
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	New York

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137951)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

International Electronic Machines Corporation (IEM)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

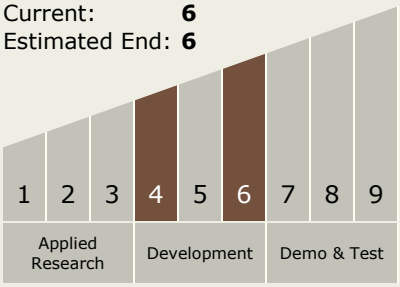
Carlos Torrez

Principal Investigator:

Bruce Mckenney

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Completed Technology Project (2012 - 2012)

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.1 Avionics Component Technologies
    - TX02.1.8 Wireless Avionics Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System